

REMARKS

Claims 146-171, 173, and 175-205 are pending in the above-identified application. Claims 146-170 and 177-205 have been withdrawn, and claims 171, 173, 175, and 176 were rejected. With this Amendment, claims 206-209 have been added. Accordingly, claims 171, 173, 175, 176 and 206-209 are at issue.

I. 35 U.S.C. § 103 Obviousness Rejection of Claims

Claims 171, 173, and 175-176 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Schetzina (U.S. Patent No. 5,670,798). Applicants respectfully traverse this rejection.

Claim 171 is directed to a semiconductor light emitting device comprising an active layer, an optical guide layer in contact with the active layer, a cap layer in contact with the optical guide layer, and a p-type clad layer in contact with the cap layer. The thickness of the cap layer is equal to or more than 2 nm and equal to or less than 20 nm.

Schetzina discloses an active layer in contact with a cladding layer, which is in turn in contact with a gradient layer. Schetzina also discloses, in Fig. 30, that in the case of laser diodes, light guiding layers may be disposed between the active layer and the cladding layer. The Examiner agrees that Schetzina does not disclose or suggest that the thickness of the cap layer is equal to or more than 2 nm and equal to or less than 20 nm.

Although the Examiner refers to cladding layer AlGa_N 114a of Schetzina a cap layer, it is well known that cladding layers have thicknesses in the order of microns rather than in the order of nanometers. As disclosed in Casey, H.C. and Panish, M.B., *HETEROSTRUCTURE LAYERS* (copy attached), the thickness of the cladding layers must be “sufficiently large to prevent the

interfaces with the p^+ -GaAs contact layer or the n^+ substrate from influencing the optical fields.” (See page 33, line 13 through page 34, line 3). Casey and Panish calculate the necessary thickness of cladding layers using representative symmetric three-layer slab dielectric waveguide shown in Fig. 22.3-2 on page 34. The relative electric field strength of this structure is shown in Fig. 2.5-10(a) on page 51. Fig. 2.5-10(a) illustrates that the electric field expands in the range of sub-micron for structures made of GaAs based materials. One skilled in the art could easily analogize the results with regards to GaAs based materials into the case of GaN based materials. Thus, the thickness of cladding layers sandwiching an active layer should be at least in the sub-micron order in the case of GaN based materials. Accordingly, one skilled in the art manufacturing a device according to the disclosure in Schetzina would not consider using cladding layer 114a with a thickness equal to or more than 2 nm and equal to or less than 20 nm.

Moreover, newly added claim 206 also specifies that the cap layer has a band gap that is always larger than that of the p-type clad layer. In Schetzina, the band gap of continuously graded layer 122a equals the band gap of cladding layer 114a at the point where the two parts meet. (See col. 10, lines 50-54). Thus, Schetzina does not disclose or suggest that the cap layer has a band gap that is always larger than that of the p-type clad layer, as required by claim 206.


For all of the reasons set forth above, Applicants respectfully submit that claims 171, 173, 175, and 176, and newly added claims 206-209 are allowable over Schetzina. Accordingly, Applicants respectfully request withdrawal of this rejection.

II. Conclusion

In view of the above amendments and remarks, Applicants submit that all claims are clearly allowable over the cited prior art, and respectfully request early and favorable notification to that effect.

Respectfully submitted,

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By: 
Marina N. Saito
Registration No. 42,121
SONNENSCHN NATH & ROSENTHAL LLP
P.O. Box 061080
Wacker Drive Station, Sears Tower
Chicago, Illinois 60606-1080
(312) 876-8000